


## SYSTEMATIC REVIEW ARTICLE 8

# Studies carried out in Portugal in the area of peripheral venous catheterization: scoping review protocol


*Estudos realizados em Portugal no âmbito do cateterismo venoso periférico: protocolo de scoping review*

*Estudios realizados en Portugal en el campo de cateterización venosa periférica: protocolo de scoping review*


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## Abstract

**Background:** Despite its ubiquitous nature, the practice of peripheral venous catheterization is not homogeneous among international clinical contexts. In Portugal, the information regarding the practice of peripheral venous catheterization is scattered in the literature, hindering efforts of a comprehensive analysis of its nature and implications.

**Objective:** To map the studies developed in Portugal in the field of peripheral venous catheterization.

**Review method:** Scoping review methodology proposed by the Joanna Briggs Institute. An adequate protocol was established for each base/repository to identify studies that meet the criteria outlined. The analysis of data relevance, extraction, and synthesis will be performed by independent reviewers.

**Presentation and interpretation of results:** The mapping of the studies carried out in Portugal in this area will contribute to the identification of the main structure, process, and outcome indicators described in national studies.

**Conclusion:** It is expected that this review will support the development of future interventions and systematic reviews that enhance the efficacy/safety of the care provided to patients with a peripheral catheter.

**Keywords:** catheterization, peripheral; review

## Resumo

**Contexto:** Apesar da sua natureza ubíqua, a prática de cateterização venosa periférica não é homogênea entre contextos clínicos internacionais. Em Portugal, a informação referente à prática de cateterismo venoso periférico encontra-se dispersa na literatura, impossibilitando uma análise suficientemente compreensiva e abrangente da sua natureza e implicações.

**Objetivos:** Mapear os estudos realizados em Portugal no âmbito do cateterismo venoso periférico.

**Método de revisão:** Metodologia de *scoping review* proposta pelo *Joanna Briggs Institute*. Foi definido um protocolo adequado a cada base/repositório, que visa a identificação de estudos que respondam aos critérios delineados. O processo de análise da relevância, extração e síntese dos dados será desenvolvido por revisores independentes.

**Apresentação e interpretação dos resultados:** O mapeamento dos estudos realizados em Portugal neste âmbito contribuirá para a identificação dos principais indicadores de estrutura, processo e resultado descritos em estudos nacionais.

**Conclusão:** Espera-se que esta revisão sustente o desenvolvimento de intervenções e revisões sistemáticas futuras que potenciem a eficácia/segurança dos cuidados prestados ao doente com cateter periférico.

**Palavras-chave:** cateterismo venoso periférico; revisão

## Resumen

**Contexto:** Apesar de su naturaleza ubicua, la práctica del cateterismo venoso periférico no es homogénea en contextos clínicos internacionales. En Portugal, la información sobre la práctica del cateterismo venoso periférico está dispersa en la literatura, haciéndolo imposible un análisis lo suficientemente completo de su naturaleza e implicaciones.

**Objetivos:** Mapear los estudios realizados en Portugal en el ámbito del cateterismo venoso periférico.

**Método de revisión:** Metodología de *scoping review* propuesta por *Joanna Briggs Institute*. Se definió un protocolo adecuado a cada base/repositorio para identificar estudios que respondan a los criterios delineados. El proceso de análisis de relevancia, extracción y síntesis de los datos será desarrollado por revisores independientes.

**Presentación e interpretación de los resultados:** El mapeo de los estudios realizados en Portugal en esta área contribuirá a la identificación de los principales indicadores de estructura, proceso y resultado descritos en estudios nacionales.

**Conclusión:** Se espera que esta revisión contribuya al desarrollo de futuras intervenciones y revisiones sistemáticas que mejoren la eficacia/seguridad de la atención del paciente con catéter periférico.

**Palabras clave:** cateterismo periférico; revisión



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## Introduction

Since its initial conception in 1658, the peripheral venous catheter (PIVC) constitutes one of the most revolutionary discoveries in the history of contemporary medicine, being used recurrently in the administration of drugs, fluids, or blood products, as well as the blood collection (Rivera, Strauss, Zundert, & Mortier, 2005).

Approximately 1.5 billion PIVC are inserted every year throughout the world, although these numbers are under-reported to the European level (Alexandrou et al., 2015). An estimated 60% to 90% of hospitalized patients requires, at least, one PIVC to comply with their treatment plan (Helm, Klausner, Klemperer, Flint, & Huang, 2015), being a comprehensive and global clinical practice. However, PIVCs are not risk-free, according to evidence of repetitive complications such as phlebitis, obstruction, extravasation, or nosocomial bloodstream infection (nBSI). These complications have a significant impact on the morbidity and mortality rates of patients, with obvious socio-economic repercussions (Helm et al., 2015). Furthermore, despite the complications associated to the presence of the PIVC, an estimated 90% of PIVC are removed prematurely, before completing the therapeutic plan that justified its insertion (Alexandrou et al., 2018).

In this sense, Jones (2018) lays down that, in addition to the sociodemographic characteristics and clinical condition of patients, the quality and effectiveness of peripheral venous catheterization are conditioned by the medical practices and devices used by health professionals during insertion, maintenance, and removal of the PIVC. Based on this perspective, the results found in the literature should be analyzed with caution as the management of peripheral venous catheterization is not uniform across international contexts (Alexandrou et al., 2015). For instance, even though a considerable number of works on this theme is published in Australia and New Zealand, Alexandrou and collaborators (2018) identified that only 26% of the PIVC were inserted by nurses. Similarly, in the United Kingdom, the peripheral venous catheterization can be performed by nurses, doctors, operational assistants, and radiology technicians (Cooper, Whitfield, Newton, Chiarella, & Machaczek, 2016). The heterogeneity reported at this level still exists in clinical contexts of European, North American, African, and Asian countries (Alexandrou et al., 2018).

In Portugal, the peripheral venous catheterization is an interdependent nursing intervention (Ordem dos Enfermeiros, Mesa do Colégio da Especialidade em Enfermagem de Saúde Infantil e Pediátrica, 2017). Nurses provide care to the person with the need for peripheral venous catheterization, from the insertion of the catheter to its removal, and the monitoring of possible changes resulting from it should be performed by these professionals (Ordem dos Enfermeiros, Mesa do Colégio da Especialidade em Enfermagem de Saúde Infantil e Pediátrica, 2017). For this purpose, nurses should receive continuous training in this area, with a view to achieving excellence in their professional activity (Ordem dos Enfermeiros, Mesa do Colégio da Especialidade em Enfermagem de Saúde Infantil e Pediátrica, 2017).

However, identifying results sensitive to nursing care is not always a linear process (Irvine, Sidani, & Hall, 1998).

Based on the quality model proposed by Donabedian, in 1980, these authors state that the analysis of the sensitive results to nursing care should meet the structure components (variables associated to nurses, sick people, and the health institution), process components (independent, dependent, or interdependent role of nurses), and result components, sensitive to nursing care, which include prevention of complications. According to Irvine and collaborators (1998), even though nurses are not the only ones responsible for the occurrence of complications, they are the best-positioned professionals to ensure continuous supervision of health care services.

However, the scientific evidence produced in Portugal on peripheral venous catheterization is scarce, hindering a comprehensive and sustained evaluation of the influence of structure and process variables in clinical outcomes associated with peripheral venous catheterization. Following a preliminary survey in JBI Database of Systematic Reviews and Implementations Reports, Cochrane Database of Systematic Reviews, CINAHL (via EBSCO), and MEDLINE (via PubMed), no literature reviews of any type (published or in progress) were found on this theme. According to Apóstolo (2017), when there are insufficient data on the evaluation of an area or focus, the systematic mapping of the scientific evidence produced could be a starting point to analyze the extent, scope and nature of the research activities carried out until then. In this way, the objective is to perform a scoping review, based on the methodology proposed by the Joanna Briggs Institute (Peters et al., 2017), with a view to mapping studies developed in Portugal on peripheral venous catheterization, analyzing and systematizing the main structure, process, and outcome indicators identified.

More specifically, this review aims to respond to the following questions: i) What are the key focus areas of studies conducted in Portugal on peripheral venous catheterization?; (ii) In Portugal, in which clinical contexts are studies conducted related to peripheral venous catheterization?; (iii) Which professional practices are adopted at the level of the insertion, maintenance, and removal of these devices in Portugal?; (iv) What are the medical devices used in Portugal in what concerns peripheral venous catheterization?; and (v) What are the clinical outcomes reported in studies conducted in Portugal on peripheral venous catheterization?

## Method of systematic review

In 2005, Arksey and O'Malley developed the first methodological framework for scoping reviews, outlining four main reasons for its implementation: (i) analyzing the extent, scope and nature of the scientific production published on a specific topic; (ii) assessing the relevance, feasibility and potential costs of conducting a systematic literature review; (iii) synthesizing and disseminating the existent scientific production on a theme, highlighting its main results among policymakers, professionals and major consumers, who may not have the time and resources to invest in their search; and (iv) identifying gaps

in the literature, contributing to the definition of next steps and studies to develop on a specific topic. Likewise, scoping reviews can be used to analyze how the research has been developed on a specific topic or scientific area (Munn et al., 2018).

In this sense, scoping reviews constitute a major step, also in nursing sciences, to any research project, supporting the development of future studies that seek to contribute to research, training, practice and policy-making in a specific topic (Peterson, Pearce, Ferguson, & Langford, 2017).

### Research strategy and identification of studies

Following the methodology proposed by the Joanna Briggs Institute (Peters et al., 2017), the participants, the concept and the context of the review will be defined (PCC mnemonic). In this logic, concerning the participants, all studies will be included that involve health professionals with skills to perform the insertion, maintenance and removal of PIVC. In relation to the concept, studies are to be included that were carried out within the context of peripheral venous catheterization of people, that report associated structure, process or outcome indicators. As regards context, studies will be integrated that were conducted in any clinical context and geographic area of the Portuguese territory.

As to the type of study, this review will consider studies of primary nature, like observational studies, transverse or longitudinal descriptive studies, quasi-experimental

before-and-after studies, case studies, and randomized controlled trials. Besides, for analysis will be included literature reviews that integrate primary studies developed in this thematic scope in Portugal.

As regards the research strategy and identification of studies, the electronic databases CINAHL and MedicLatina (via EBSCO), MEDLINE (via PubMed), SciELO, Scopus, LILACS, and Cochrane Central Register of Controlled Trials will be used. Then, in order to map non-published literature such as academic theses and dissertations developed in Portugal, the search for research strategy will be replicated on *Repositório Científico de Acesso Aberto de Portugal*, *Banco de Teses da CAPES*, and OpenGrey. As a way to encourage a comprehensive analysis of the phenomenon under study, time limits will not be considered to the search and selection of articles. As regards the language of publication, articles written in Portuguese, English, Spanish, or French will be included.

The research will be developed in three stages, namely: (i) limited search on MEDLINE (via PubMed) and CINAHL (via EBSCO), so as to identify the most frequently used indexing words and terms (Table 1); (ii) the indexing words and terms identified will be combined in a single research strategy, in accordance with the specificities of each selected database/repository; (iii) the list of references of each selected study will be analyzed by two independent reviewers to include potential additional studies.

Table 1

*Example of the initial search on MEDLINE (via PubMed) on 17 December 2019*

Query	Results
Search: (((((Catheters, Indwelling[MeSH Major Topic]) OR (Catheters[MeSH Major Topic]) OR (Catheter-Related Infections[MeSH Major Topic])) OR (Catheter Obstruction[MeSH Major Topic])) OR (Vascular Access Devices[MeSH Major Topic])) OR (Catheterization, Peripheral[MeSH Major Topic])) OR ("peripheral venous catheter"[Title/Abstract]) OR ("venous line"[Title/Abstract])) OR ("venous access"[Title/Abstract])) OR ("venous device"[Title/Abstract])) OR ("peripheral catheter"[Title/Abstract])) OR (cannula*[Title/Abstract])) OR (PIVC[Title/Abstract])) OR (PIVC[Title/Abstract])) OR (canula*[Title/Abstract])) OR ("peripheral intravenous catheter"[Title/Abstract])) OR ("venous catheter"[Title/Abstract])) OR ("intravenous catheter"[Title/Abstract])) AND Portugal	284

### Selection of studies

After the search in databases and repositories, the identified studies will be entered in the Mendeley software (Elsevier, Netherlands), through which the duplicated articles will be deleted. Then, two independent reviewers will examine the titles and abstracts of the studies found, confronting them with the inclusion criteria for the review. All the studies that meet the set criteria will be analyzed in full text. The full-text studies that do not meet the inclusion criteria will be excluded, and the reasons will be identified. The results of this process will be presented using the Preferred Reporting Items

for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISM-ScR) checklist (Tricco et al., 2018). Any discrepancies that may arise among the reviewers will be solved by debate or with the help of a third reviewer.

### Data extraction

Data extraction will be performed by two independent reviewers, using an instrument built by researchers to respond to the review objective and questions (Figure 1). During this phase, the instrument may change according to possible emerging needs encountered by researchers.

**Review Title**

Studies carried out in Portugal in the area of peripheral venous catheterization: scoping review protocol

**Review questions:**

- What are the key focus areas of studies conducted in Portugal on peripheral venous catheterization?
- In Portugal, in which clinical contexts are studies conducted related to peripheral venous catheterization?
- Which professional practices are adopted at the level of the insertion, maintenance, and removal of these devices in Portugal?
- What are the medical devices used in Portugal in what concerns peripheral venous catheterization?
- What are the clinical outcomes reported in studies conducted in Portugal on peripheral venous catheterization?

**Inclusion criteria:**

- **Participants**  
Health professionals with skills to perform the insertion, maintenance and removal of PIVC.
- **Concept**  
Studies carried out within the context of peripheral venous catheterization of people, that report associated structure, process or outcome indicators.
- **Context**  
Studies conducted in any clinical context and geographic area of the Portuguese territory.

**Data extraction and study characteristics**

<b>Authors</b>	
<b>Year of Publication</b>	
<b>Type of Study</b>	
<b>Study Objectives</b>	
<b>Number of Participants</b>	
<b>Relevant concepts for the review question</b>	

Figure 1. Instrument created by the researchers for data extraction.

Transversely, extracted data will focus on the characteristics of the study population, design, and relevant results to respond to the question and specific objectives. During the extraction process (when and where needed), the authors of the selected studies will be contacted to clarify data or provide additional information. Any divergences that may arise at this stage will be solved by debate between reviewers or, if there is no consensus, with the help a third element.

### Data synthesis

The mapped data will be presented in narrative form, in alignment with the objective and focus of the scoping review, using tables and/or graphs. Similarly to the previous phase, synthesis and presentation of data will be carried out by consensus between the two reviewers. Any divergences will be solved with the help of a third element.



For the questions “In Portugal, in which clinical contexts are studies conducted related to peripheral venous catheterization?” and “What are the key focus areas of studies

conducted in Portugal on peripheral venous catheterization”, tables and graphs can include data listed in Table 2.

Table 2

*Data synthesis grid for first and second review questions*

Study	Clinical Setting	Identified foci (please describe the identified foci)		
		Structure	Process	Outcome

For the review question “Which professional practices are adopted at the level of the insertion, maintenance, and

removal of these devices in Portugal?”, tables and graphs can include data listed in Table 3.

Table 3

*Data synthesis grid for the third review question*

Study	Health professional responsible for PIVC management	Identified professional practices (please describe the identified practices)		
		PCV insertion	PIVC maintenance	PIVC removal

For the review questions “What are the medical devices used in Portugal in what concerns peripheral venous catheterization?” e “What are the clinical outcomes re-

ported in studies conducted in Portugal on peripheral venous catheterization?”, tables and graphs can include data listed in Table 4.

Table 4

*Data synthesis grid for fourth and fifth review questions*

Study	Identified medical devices	Outcomes clínicos reportados				
		Phlebitis	Nosocomial bloodstream infection	Extravasation	Infiltration	(...)

## Presentation and interpretation of the results

The mapping of scientific production developed in Portugal on peripheral venous catheterization will contribute to the analysis and discussion of professional practice standards, characteristics of the devices used, and the main complications identified in Portugal.

## Conclusion

This scoping review will expectedly constitute a useful starting point for the analysis and systematization of the main structure, process and outcome indicators identified in national studies on peripheral venous catheterization. In addition to the contribution to research, this research will hopefully contribute to the improvement of clinical

practice within the context of PIVC, allowing the identification of key challenges and shortcomings that may justify the need to develop professional training programs suitable for clinical and organizational contexts, taking into account the available resources. Similarly, the results obtained with this review can substantiate the need to develop, implement, and adopt national standards for care to the person with a PIVC (hitherto nonexistent), promoting more efficient and quality care for patients and health professionals.

## Author contributions

Conceptualization: Santos-Costa, P.

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